June 24, 2022

VIA ELECTRONIC FILING

Ms. Rajinder Sahota, Deputy Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: RNG Coalition Comments on the Draft 2022 Climate Change Scoping Plan

Dear Ms. Sahota:

The Coalition for Renewable Natural Gas (RNG Coalition) represents the Renewable Natural Gas (RNG) industry in North America. We are a non-profit association of companies and organizations dedicated to the advancement of RNG as a clean, green, alternative, and domestic energy and fuel resource. RNG Coalition's diverse membership includes each sector of the RNG value chain: waste collection, waste management & recycling companies, renewable energy/gas developers, engineers, banks, financiers, investors, gas/power marketers, gas/power transporters, manufacturers, technology & service providers, environmental advocates, research organizations, organized labor, law firms, consultants, non-profits, airports, municipalities, universities, utilities, and individual ratepayers.

We appreciate the opportunity to submit comments on the Draft 2022 Greenhouse Gas Scoping Plan (Draft Plan, Plan or DSP). The DSP continues California leadership on addressing the climate crisis. We applaud the fact that the DSP targets full carbon neutrality, lays out a clear path to reach this ambitious goal by no later than 2045, and recognizes the importance of the use of renewable gases—both RNG (which the DSP refers to as biomethane) and renewable hydrogen.

About Renewable Gases

As described in more detail below, many experts agree that renewable gases can be a strong climate change mitigation tool and that such gases are needed in certain applications across all sectors of the economy in perpetuity. Strategies that utilize renewable gases will displace the use of fossil fuel; increase capture and utilization of methane emissions from organic waste streams; and improve the circularity of California's economy through recycling, the creation of bioproducts, and carbon removals from the atmosphere. While we appreciate the inclusion of renewable gases in the various sections in the Draft Plan, we hope that our Coalition's comments below will assist in the drafting of the Final Plan and provide more detail to help shape California's strategy for both near- and long-term sustainable production and use of renewable gases.

Overview of Renewable Natural Gas

RNG is biogas-derived fuel that has been captured from organic waste streams—including agricultural wastes, municipal wastewater, and municipal solid waste in landfills—and upgraded to achieve quality standards necessary to blend with, and substitute for, geologic natural gas. Every community in America produces waste. As that waste breaks down, it often emits methane, which is a potent and harmful GHG.[1] RNG projects capture this methane from existing sources of food waste, animal manure, wastewater sludge and garbage, and redirect it away from the environment, repurposing it as a clean, green energy source.

RNG can be used in all the same applications as conventional natural gas, including in transportation, industrial, heating, and electricity applications. The most common method to produce RNG today is through the biological process of Anaerobic Digestion (AD). RNG is key to reducing fossil fuel CO_2 emissions and, as a significant bonus, RNG also reduces the GHG impacts of organic wastes by capturing methane from these waste streams. Solid waste is expected to grow nearly 70 percent by 2050 due to natural human activity.[2] RNG provides a near-term solution for effectively managing this colossal waste issue and gets us on the path to implementing a source of clean, reliable, renewable fuel. California regulators and companies have recognized these benefits, making RNG a key component of many prior climate change strategy discussions. RNG has been a proven clean source of energy for decades at low volumes but is growing in importance, scale, and popularity today because of the urgent need to combat climate change and deal with the emissions of society's growing waste streams as quickly as possible.

Overview of Renewable Hydrogen

In the mid- to long-term, hydrogen produced from renewable feedstocks, such as clean electricity and waste biomass, should also be viewed as an essential part of California's renewable gas mix. In a similar manner to RNG, waste-biomass-derived hydrogen is poised to contribute to a circular bioeconomy as a pathway for recycling biogenic resources which are not well suited to AD, often by combining thermochemical processes (such as pyrolysis and gasification) with steam methane reforming or similar technologies to make hydrogen from methane. Bio-derived renewable hydrogen is an effective complement to electrolytic hydrogen sourced from renewable electricity, and both pathways have an important role to play.

The DSP's Call for Use of Renewable Gases as a GHG Abatement Strategy Correctly Aligns with Recommendations from International Climate Science Experts and Other Government Agencies Leading the Push Toward Global Decarbonization

Recently we have noticed, with some frustration, an increase in opposition to the development and use of renewable gases organized by a narrow, yet vocal, set of stakeholders in California who primarily oppose RNG because of its association with underlying existing industries (such as waste, agriculture, and the natural gas system). These groups often confuse (or intentionally conflate) the fundamental

[1] Draft Plan at 80.

[2] https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

existing emission problems with existing industries with the RNG projects themselves, which can actually help alleviate/improve these existing impacts.

Consequently, despite the strong recognition of a clear role for renewable gases in the DSP, we feel compelled to reemphasize the views of leading climate scientists and government agencies that have all repeatedly explained the benefits of renewable gases as a key GHG abatement strategy. We briefly summarize recent examples below.

Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) calls methane capture and recovery from solid waste management "a short-term 'win-win' policy that simultaneously improves air quality and limits climate change."[3] Furthermore, the 2021 IPCC Working Group I report recommends that "strong, rapid, and sustained reductions in CH_4 emissions" should be a first priority for policymakers.[4] In its most recent approved draft report on GHG mitigation,[5] the IPCC states that:

> *"Sustainable biofuels, low emissions hydrogen, and derivatives (including synthetic fuels) can support mitigation of CO_2 emissions from shipping, aviation, and heavy-duty land transport but require production process improvements and cost reductions."*[6]
>
> *"Because some applications (e.g., aviation) are not currently amenable to electrification, it is anticipated that 100% renewable energy systems will need to include alternative fuels such as hydrogen or biofuels."*[7]
>
> *"Several biomass conversion technologies can generate co-benefits for land and water. Anaerobic digestion of organic wastes (e.g., food waste, manure) produces a nutrient-rich digestate and biogas that can be utilised for heating and cooking or upgraded for use in electricity generation, industrial processes, or as transportation fuel. The digestate is a rich source of nitrogen, phosphorus and other plant nutrients, and its application to farmland returns exported nutrients as well as carbon."*[8]
>
> *"Scaling up bioenergy use will require advanced technologies such as gasification, Fischer-Tropsch processing, hydrothermal liquefaction (HTL), and pyrolysis. These pathways could deliver*

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[3] See page 6-91 of: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_06.pdf

[4] https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf, pg. 27

[5] https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf

[6] Ibid. Page SPM-41

[7] Ibid. Page TS-54

[8] Ibid. Page 12-102, line 36 (citations removed)

several final energy carriers starting from multiple feedstocks, including forest biomass, dedicated cellulosic feedstocks, crop residues, and wastes."[9]

"Most production routes for biofuels, biochemicals and biogas generate large side streams of concentrated CO_2 which is easily captured, and which could become a source of negative emissions."[10]

Based on the statements above, the RNG Coalition believes the DSP's vision for a role for renewable gases is fully aligned with the work of the IPCC. We encourage CARB to continue to emphasize this fact and for California stakeholders to trust scientific experts (at IPCC and at CARB) on these issues.

United States Environmental Protection Agency

The U.S. EPA has long supported biogas recovery for use as RNG under programs such as the Landfill Methane Outreach Program (LMOP),[11] AgSTAR,[12] and the Renewable Fuel Standard.[13] The "Benefits" section of the LMOP website, for example, describes RNG as a resource that provides greenhouse gas emission reductions, fuel diversity benefits, economic benefits, and local air quality benefits. In the agricultural sector, AgSTAR has for more than 20 years promoted covered lagoons and digesters as the top solutions for manure management.[14] More recently, EPA added Renewable Natural Gas as an explicit opportunity within the Methane Challenge program, noting that, "as a substitute for natural gas, RNG has many end-uses, including in thermal applications, to generate electricity, for vehicle fuel, or as a bio-product feedstock.[15]

Canada

Canada has made several climate commitments backed by concrete policies. They have stated that:

"To meet our new 2030 and 2050 net-zero goals, Canada's economy will need to be powered by two equally important energy sources – clean power and clean fuels. Electrification – clean power – provides a near-term pathway for emissions reductions in many sectors including personal transport and the built environment. But clean fuels (low-carbon fuels that typically consist of clean hydrogen, advanced biofuels, liquid synthetic fuels, and renewable natural gas)

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[9] Ibid. Page 6-40, line 7.

[10] Ibid. Page 11-32, line 12.

[11] https://www.epa.gov/lmop/renewable-natural-gas

[12] https://www.epa.gov/agstar

[13] https://www.epa.gov/renewable-fuel-standard-program

[14] https://www.epa.gov/sites/default/files/2019-09/documents/epa_non-co2_greenhouse_gases_rpt-epa430r19010.pdf

[15] https://www.epa.gov/system/files/documents/2022-05/MC_BMP_TechnicalDocument_2022-05.pdf

are expected to play a critical role in 'hard-to-decarbonize' sectors such as industry and medium- and heavy-duty freight.

Even in a scenario with ambitious electrification, it is estimated that 60 percent or more of national energy demand in 2050 could need to be met with clean fuels to meet a net-zero goal."[16]

In its 2030 Emissions Reduction Plan released on March 29, 2022, the Government of Canada adds that economy-wide strategies to reduce GHG emissions, inclusive of clean fuels and methane emissions reduction, will enable Canada to meet its climate targets in the most flexible and cost-effective way.[17]

Canada also has strong methane emission reduction targets. In November 2021, Canada joined the Global Methane Pledge, which has been signed by over 100 countries, and committed to reduce anthropogenic methane emissions across all sectors by at least 30% below 2020 levels by 2030. The measures outlined in the 2030 Emissions Reduction Plan may result in a reduction in waste-sector GHG emissions of 49% by 2030 against 2005 levels.[18]

European Union

Europe has long supported RNG under the broad Renewable Energy Directive (RED) framework.[19] Recent revisions known as the "Hydrogen and Decarbonized Gas Package"[20] reinforce the support for renewable gases as a key greenhouse gas reduction strategy in the context the "Fit for 55"[21] strategy, which is essentially the EU's analogous process to CARB's Scoping Plan.

Individual European Union member states already have very high biomethane blend rates. For example, Denmark's proportion of biogas injected into its system was almost 25% of total demand as of the end of 2021. They hope to be able to meet 75% of gas demand from biogas by 2030 and 100% by 2034.[22]

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[16] Natural Resources Canada, "Clean fuels – fueling the future," 2022. https://www.nrcan.gc.ca/our-natural-resources/energy-sources-distribution/clean-fuels-fueling-the-future/23735

[17] Environment and Climate Change Canada, *2030 Emissions Reduction Plan: Canada's Next Steps for Clean Air and a Strong Economy* (2022), page 23 (pdf page 25). https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/erp/Canada-2030-Emissions-Reduction-Plan-eng.pdf

[18] Ibid, page 90 (pdf page 92)

[19] https://www.europeanbiogas.eu/renewable-energy-legislation/#:~:text=In%20general%2C%20the%20Directive%20is,border%20trade%20of%20biomethane%20easier .

[20] https://ec.europa.eu/commission/presscorner/detail/en/ip_21_6682

[21] https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/

[22] https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/011022-denmark-hikes-proportion-of-biogas-in-grid-to-25-grid-operator

International Energy Agency

The International Energy Agency's (IEA) *Net Zero by 2050* report from May 2021 projects that, to reach carbon neutrality, RNG use will increase seven times from 2020 levels by 2030 and over 27 times 2020 levels in 2050, leading to a blend rate in gas networks of above 80%. The report also notes that a "key advantage" of RNG is ability to "use existing natural gas pipelines and end-user equipment",[23] continuing that "[t]he share of low-carbon gases (hydrogen, biomethane, synthetic methane) in gas distributed to buildings rises from almost zero to 10% by 2030 to above 75% by 2050",[24] and that "[g]overnments should prioritise the co-development of biogas upgrading facilities and biomethane injection sites by 2030, ensuring that particular attention is paid to minimizing fugitive biomethane emissions from the supply chain."[25] These statements surrounding the timeline and trajectory for RNG development and use align with our vision for the future of the RNG industry in California and North America.

The Draft Plan Should Clearly Signal How CARB will Adopt More Ambitious Targets in the Low Carbon Fuel Standard and Work to Align RNG Accounting Across End Uses and Programs

As we move toward carbon neutrality, the Low Carbon Fuel Standard (LCFS) will continue to be an important driver of RNG use. Therefore, we recommend that in the Final Plan CARB strengthen clarity about the level of ambition of future LCFS targets.

While we understand that the final values for new LCFS targets must be developed in a (hopefully expedient) future rulemaking. We agree with the language in the DSP that implies that this will require both aggressive targets post-2030 and significant adjustments to targets in the 2020s, and we support these statements and the other proposed changes to the LCFS outlined on page 154 of the Draft Plan.

However, we request that the Final Plan provide more detail as to the likely range of near-term stringency required achieve the long-run economy-wide carbon neutrality goal. An initial signal from CARB in the Final Plan will help the LCFS credit market make a more moderated transition to account for these anticipated programmatic changes. High levels of price volatility in the system does not benefit anyone, so the earlier that a range of potential future targets can be established, the better.

We also thank CARB staff for highlighting in the Draft Plan that the LCFS is overperforming (i.e., delivering more emissions reductions) than anticipated in the 2017 Scoping Plan.[26] To build on this success, the Final Plan should also direct CARB staff to explore LCFS rule changes to ensure that:

- All actual GHG benefits of RNG are fully recognized in the LCFS

[23] Ibid., pg. 78

[24] Ibid., pg. 146

[25] Ibid., pg. 112

[26] DSP at 56.

- LCFS carbon intensity (CI) scoring and RNG tracking tools are further streamlined, aligned with RNG use in other sectors (e.g., utility procurement of RNG), and exported outside of California where possible[27]
- RNG can more easily be recognized as an input into other low carbon transportation fuels

With respect to capturing all real-world benefits, CARB should adjust all crediting to be trued-up based on verified ex-post actuals (rather than ex-ante estimates) of carbon intensity. Further, GHG accounting could be expanded to capture all digestate-related benefits of RNG projects and to better account for the benefits discussed in the following two sections of these comments.

The LCFS has become the gold standard for tracking the GHG benefits of RNG project development. CARB should continue to build upon this leadership and find ways to streamline, export and harmonize LCFS CI scoring tools, make use of leading environmental registries tracking RNG production volumes, and enhance the verification practices from the LCFS to reduce pathway processing timelines and to serve all end uses of renewable gases. If done well, this framework for RNG could progress first in California, then to the Pacific Coast Collaborative, and ultimately across North America to create a uniform method of incenting renewable gases.[28]

Finally, the LCFS could be adjusted so that RNG can better receive recognition for use as an input to produce other renewable transportation fuels, such as sustainable aviation fuel or renewable hydrogen. As described in more detail below, when renewable hydrogen production is paired with carbon capture and sequestration, the RNG process is ultimately carbon negative.

Methane from Organic Wastes Deserves Continued Attention in the Final Plan

The DSP explains the importance of maintaining focus on reducing short lived climate emissions, including methane,[29] but it stops short of recommending significant policy changes that are necessary to adapt to new research about methane emission levels from California's waste industry, and to reflect real-world implementation challenges that have occurred since the last version of the Plan was published in 2017.

[27] In line with the DSP's statements related to fostering "engagement with partners to develop and export policies" (see DSP at 19).

[28] Section 38564 of the Californian Health and Safety Code requires CARB to "consult with other states, and the federal government, and other nations to identify the most effective strategies and methods to reduce greenhouse gases, manage greenhouse gas control programs, and to *facilitate the development of integrated and cost-effective regional, national, and international greenhouse gas reduction programs*." [emphasis added] We believe that developing a regional market for RNG between the Pacific Coast Collaborative states and eventually across North America would epitomize a successful outcome of this requirement.

[29] DSP at 22.

Like the 2017 Plan,[30] the Proposed Scenario in the DSP calls for achievement of 75% organic waste diverted from landfill by 2025,[31] in line with statutory requirements. Unfortunately, the reality is that the buildout of necessary infrastructure to hit this target is lagging, in part because the existing incentive frameworks undercount the GHG benefits of organic waste diversion projects and landfill gas capture to produce RNG. We recommend that the Final Plan provide a deeper discussion on how to address this issue and increase the rate of deployment of composting and AD capacity.

The flyover studies conducted by NASA's Jet Propulsion Laboratory for the California Methane Survey have demonstrated that California's landfill emissions are higher than previously understood and that both composting and AD projects must also be highly mindful of methane performance.[32] Consequently, CARB's assumed landfill gas capture rates, and associated avoided methane benefits when organic material is diverted from landfills, should be revisited.

More proper recognition of the facility-specific benefits for landfill diversion—to both composting and AD facilities, and in a way that directly leads to expedited funding for additional facility development—is crucial. Properly valuing the methane generated by organic waste and the environmental/climate benefits of capturing and destroying that powerful GHG will be critical in helping to ensure that organic waste recyclers are able to invest in best practices in maintenance/operations and in the highest quality monitoring technologies.

RNG Works Well with Both Natural and Engineered Carbon Removals

The use of carbon capture and sequestration (CCS) technologies, such as geologic storage or biochar, will produce negative-GHG outcomes when paired with RNG and hydrogen derived from waste biomass. The DSP explains how renewable hydrogen production from bio feedstocks will provide a necessary pathway to *remove* emissions from the atmosphere, creating an expedient pathway to significant GHG reductions that may be necessary if global emission targets are overshot.[33]

We agree with the Draft Plan's strategy to "expand markets for products made from organic waste, including through recognition of the co-benefits of compost, biochar, and other products."[34] We

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[30] See page 68 of the 2017 Scoping Plan, which states that: "Per SB 1383, reduce methane emissions at landfills by reducing landfill disposal of organic waste 75 percent below 2014 levels by 2025, including establishing energy infrastructure development and procurement policies needed to encourage in-vessel digestion projects and increase the production and use of renewable gas." https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf

[31] DSP at 63.

[32] Cusworth, D.H., Duren, R.M., Thorpe, A.K., *et al*. 2020. Using remote sensing to detect, validate, and quantify methane emissions from California solid waste operations. *Environmental Research Letters,* 15(5) [doi:10.1088/1748-9326/ab7b99]

[33] The DSP's proposed scenario estimates that 5-10 $MTCO_2e$ from bioenergy with carbon capture and storage (BECCS) may be available from recoverable biomass, but this will require the permitting, construction, and startup of new infrastructure in California. See DSP at 75.

[34] DSP at 189.

request that the Final Plan explain in more detail how these markets will be created and recommend that such markets build on successful programs that are already strong RNG drivers, such as the LCFS.

Geologic or soil sequestration of the biogenic carbon contained in waste feedstocks from RNG and biomass-derived renewable hydrogen is only one of the possible carbon-negative processes associated with RNG. Carbon removal benefits are separated in the DSP from the methane destruction potential of existing AD to RNG, which is already leading to carbon-negative outcomes on a lifecycle basis relative to existing environmental control baselines for some RNG projects.

Further, other opportunities to reduce high-GWP gases exist in the renewable gas space. For example, recognition of the nitrogen cycle benefits and N_2O reductions[35] associated with controlled-release organic fertilizer derived from digestate would better promote all AD projects to process their digestate into this type of high-value fertilizer product. These natural/organic fertilizers would serve as a meaningful alternative to synthetic fertilizers, which contribute significant N_2O emissions and ground water challenges. The LCFS program could serve as an existing enabler for the accounting of these additional carbon intensity reductions from RNG projects.

The Proposed Scenario is the Most Feasible Scenario Examined

We support the Proposed Scenario (Alternative 3) for achieving carbon neutrality which, as the DSP states, "…is more feasible than Alternative 1 and Alternative 2 due to the longer time frame for clean technology and fuel deployment…The additional 10 years for achieving carbon neutrality also allow for technologies to scale and be deployed at lower costs. The Proposed Scenario provides significant health benefits in 2045…and has the least slowing effect on employment and economic growth."[36]

Understanding realistic timelines for technology deployment—and the time it takes to drive technology cost declines globally once deployment at commercial scales does begin to occur—is a critical part of the Scoping Plan exercise. As covered in more detail in our prior comments submitted on the draft modelling results on April 4, 2022,[37] we respectfully assert that the GHG reductions in the Alternative 1 scenario have been overstated compared to what could practicably be achieved using the aggressive "early retirement" strategies for vehicles and appliances implied by the description of Alternative 1.

Convincing consumers to undertake early retirement of working vehicles and appliances—including those that are as new as five years old, which Alternative 1 relies on—would be extremely difficult to accomplish in practice. This critique of Alternative 1 should not be read to imply that we oppose the swiftest possible action to reduce greenhouse gases—only that we oppose poorly crafted policy solutions that do not consider the full universe of abatement strategies, do not maximize abatement

[35] Quantification methods for N_2O has improved and are now suitable for incorporation into GHG policy frameworks. See: Kanter et al., *Building on Paris: Integrating Nitrous Oxide Mitigation into Future Climate Policy*, Current Opinion in Environmental Sustainability, Volume 47, December 2020, Pages 7-12. https://www.sciencedirect.com/science/article/pii/S1877343520300324

[36] DSP at 52.

[37] https://www.arb.ca.gov/lists/com-attach/48-sp22-modelresults-ws-ADJcaAEwB2BWYFJm.pdf

certainty, do not attempt to minimize total societal costs, and ignore the proven GHG reduction benefits of RNG.

Conclusion

RNG Coalition thanks CARB for the opportunity to provide feedback on the Draft Scoping Plan. We commend CARB for reflecting, in the DSP, the benefits of existing state policy promoting renewable gases and the status of overall gas sector decarbonization trends.

Renewable gases, such as RNG and hydrogen, are poised to play a continued and growing role in the state's climate policies, and we look forward to a Final Scoping Plan that proposes new policy improvements to effectuate that outcome.

Sincerely,

/S/
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